

## 1. Executive Summary

Globally, over a billion people lack access to electricity and an estimated billion more receive only intermittent service. While grid extension may make sense for densely populated urban areas, 85%<sup>1</sup> of the world's unelectrified are in rural locations where transmission losses would outweigh the benefits of building out the grid. The solar energy company d.light<sup>2</sup> seeks to transform the way the world thinks about achieving universal energy access and is committed to proving that renewable, decentralized, and democratized power solutions are the most modern and practical way to deliver universal energy access.

Through the support of the United States Agency for International Development's (USAID) Development Innovation Ventures (DIV) facility,<sup>3</sup> d.light executed a go-to-market pilot for the world's most affordable, high-quality, off-the-shelf but upgradeable solar energy solution on the market to date (Uganda, 2013-2014). The launch of the innovative D20g solar home system constitutes an important proof-point in the step-change transformation that must take place in terms of how the international business and policy community thinks of energy access solutions: renewable solar energy technology can be harnessed for bottom-of-the-pyramid household lighting and small appliance power needs, where consumers are in control of how much power they purchase through flexible payment platforms appropriate for bottom-of-the-pyramid (BOP) cash flows.

d.light leveraged three primary innovations in consumer-level solar power for the D20g:

- A commitment to minimizing complexity for the retailer and customer, thereby eliminating the need for in-field technical support;
- Building in the option for flexibility and upgradeable power needs; and
- Integrated pay-as-you-go technology in order to offer a solution that can be paid for over time on a frequency and scale that matches the cash flow of most developing world households.

The value proposition of the D20g was fully realized through the go-to-market pilot. By grant close,<sup>4</sup> a total of 8,996 units were sold, exceeding d.light's grant target of 5,250 by 170%. The

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<sup>1</sup> Ibid.

<sup>2</sup> d.light is a global solar energy company delivering affordable solar-powered solutions designed for the two billion people in the developing world without access to reliable energy. d.light provides distributed solar energy solutions for households and small businesses that are transforming the way people all over the world use and pay for energy. Through 10 field offices and four hubs in Africa, China, South Asia and the United States, d.light has sold over eight million solar light and power products in 62 countries, improving the lives of more than 40 million people. d.light is dedicated to providing the most reliable, affordable and accessible solar lighting and power systems for the developing world and reaching 100 million people by 2020.

<sup>3</sup> In 2012, d.light received a \$1M grant Stage 2 grant from DIV, an open competition supporting breakthrough solutions to the world's most intractable development challenges—interventions that could change millions of lives at a fraction of the usual cost. More information on USAID/DIV is available at [www.usaid.gov/div](http://www.usaid.gov/div).

<sup>4</sup> September 19, 2014



D20g delivers on each of the pillars of DIV's model, as outlined below and covered in more detail in the body of this report.

- **Evidence of impact:** As demonstrated through a rigorous quasi-experimental impact evaluation, the D20g generates positive social impact on overall customer satisfaction, lighting usage, energy expenditure and other socioeconomic outcomes, and health and personal safety.
- **Cost-effectiveness:** Market-based distribution of the d.light D20g can reach 20 million households (approximately 100 million people) in 10 years, at a per household cost of \$170 to the consumer and \$113 to public stakeholders like USAID, for 4+ years of service. No other scalable solution is available at a similarly low cost, and with equally positive benefits.
- **Pathways to scale:** Based on this degree of success, d.light is confident that our D-series low-power home systems will require an initial period of hybrid scaling to enable accelerated market development and significant up-front outlays for consumer financing, but will ultimately scale commercially through private investment and revenue generation.

## 2. Overview of the innovation

Globally, over a billion people lack access to electricity and an estimated another billion receive only intermittent service. The International Energy Agency estimates it will cost \$33 billion dollars a year to achieve universal energy access by 2035<sup>5</sup>—nearly \$700 billion in total—through electrical grid extension. However, this figure does not begin to address the supply and service improvements that would be required to ensure these over two billion people have regular and reliable access to affordable energy services. Moreover, the budget for this massive level of infrastructure development does not currently exist within multilateral institutions and developing world governments.

d.light seeks to transform the way the world thinks about achieving universal energy access. While grid extension may make sense for densely populated urban areas, 85%<sup>6</sup> of the world's un-electrified are in rural locations where the substantial costs and transmission losses often make it impractical to build out the grid, particularly in the developing world. Renewable, decentralized, and democratized power solutions are an economical, timely and practical way to deliver universal energy access. Through this kind of approach, d.light estimates that universal energy access could be achieved at a tenth of the cost and in nearly half the time as the IEA's proposal.

The launch of d.light's innovative D20g solar home system is an important proof-point in this transformation: that renewable solar energy technology can be harnessed for bottom-of-the-pyramid household lighting and small appliance power needs, where consumers are in control of how much power they purchase through flexible payment platforms appropriate for bottom-of-the-pyramid (BOP) cash flows. As such, the **d.light D20g home system constitutes a unique value proposition for energy poor consumers in the developing world: a market leading affordable, reliable, off-the-shelf, upgradeable energy service with a bona fide quality guarantee.**

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<sup>5</sup> Energy Poverty: How to Make Modern Energy Access Universal? (International Energy Agency, United Nations Development Programme, United Nations Industrial Development Organization, 2010): 17.

<sup>6</sup> Ibid.

*Pictures 1 & 2: Typical low-quality lighting products in rural Uganda*



These photos were taken during the impact evaluation survey and depict the mix of typical baseline lighting sources of households in the D20g go-to-market pilot area. From left to right, the photo above shows a “paraffin lantern” (large, hurricane-type kerosene lantern), a “tadooba” (effectively a kerosene candle, welded together out of scrap metal with a cloth wick), and a battery-driven LED lantern. The photo below shows a variety of battery-driven flashlights. LED lanterns and flashlights are referred to as “torches” in eastern Uganda. These battery-driven lights tend to be used for things such as lighting the way to the restroom during the evening, and not continual lighting.



## **2.1. D20g product development**

### **2.1.1. Summary of unique value proposition**

While there were similar offerings on the market when the d.light D20g system was launched, these other solar home systems were extremely complicated in terms of the technical information a retailer needed to possess and the decisions a customer needed to make, as the solar panel, battery, LED lights, and other accessories all had to be purchased separately. These systems also required installation by a trained technician and ongoing service and maintenance. Moreover, they required substantial upfront costs as consumer financing mechanisms were still quite limited in terms of flexibility and ease of use. In some cases, the battery replacement is required as regularly as every 6-12 months, meaning customers faced significant recurring costs in addition to the substantial upfront cost of purchasing the system. This technically and resource intensive process significantly limited the adoption of solar home systems.

d.light sought to address this adoption limitation gap through three primary innovations:

#### **Innovation #1: d.light committed to minimizing complexity for the retailer and customer, thereby eliminating the need for in-field technical support.**

- Pre-customized offering: As a result of extensive consumer research by d.light's product development team, the D20g product was optimized for foundational consumer needs. The "base unit" includes 2 fixed LEDs, a portable lantern, plus the optimal battery and solar panel that would provide enough power for high quality lighting and also charge mobile phones and radios. This eliminated the need for a retailer or customer to make technical decisions about how much energy could be generated and stored and how to optimally configure the system.
- Plug-and-play: The D20g product is designed for self-installation and so the set-up is straightforward and easy to follow from the basic instruction pamphlet included in the box. Customers can take the product home, self-install and immediately begin using the system.
- Maintenance free, long-lasting: The battery and component parts of the system are designed for maximum, long-term reliability. The D20g is designed to last at least 4 years, and d.light's Free Replacement Warranty policy commits retailers to honor the warranty for two years from the purchase based on the date engraved on the product itself. A customer does not need to return to the same retailer to fulfill their warranty and is not required to show proof of payment.

#### **Innovation #2: d.light built in the option for flexibility and upgradeable power needs.**

The decision to offer two fixed LEDs and one portable lantern in the base unit in the box was based on research indicating that this combination would best serve a household's needs for a fixed light in a main sitting room and one other priority room. In addition, a portable lantern can serve as a light that can be moved around between remaining, lower-use rooms as well as

carried outside for evening activities like checking on livestock or latrine visits. Also, the battery pack offers two extra ports in the event that the consumer wishes to add more LEDs. The D20g retailers sell additional LEDs separately as accessories, for upgradeable energy access that meets consumers growing energy needs.

The fixed LED bulbs can be hung from the wall or ceiling, and each bulb comes with its own wall switch that provides both low and high settings. This ability to mimic a grid-based power experience provides the customer with a highly aspirational standard of living.

**Innovation #3: d.light integrated pay-as-you-go technology to offer a solution that can be paid for over time on a frequency and scale that matches the cash flow of most developing world households.**

Without financing, the D20g system retails for roughly \$185 USD. Because this upfront cost is often too large of an investment for bottom-of-the-pyramid households in the developing world, d.light worked with third parties to embed a GSM<sup>7</sup>-enabled technology that would allow for an installment-based payment system, making the system affordable to a much broader population of households. The GSM technology enables two-way communication between the D20g product and a sophisticated backend system. This ability to communicate between the product and the backend system allows the customer to send a mobile money transfer to the backend, which then tells the product the duration of usage it can allow before locking—until further credit is purchased through additional mobile money payments. In other words, after the customer makes the required down payment for the product, they must continue to make payments if they wish to use the product. If no payment is made, the product remains locked until a payment is made. By integrating a GSM technology to allow communication between the product and back end system, a technology-based solution is used to create an assurance of payment that is far more cost-effective than human monitoring and collection. In addition to a “control panel” that indicates how much credit is left, customers are also prompted to make repayments through live customer support calls.<sup>8</sup>

The value of the payments—both down payment and future increments—can be tailored to

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<sup>7</sup> GSM stands for “Global System for Mobile communications” and is the cellular technology that transmits voice and data for mobile phones.

<sup>8</sup> After 3 days of non-payment, customer service staff follow-up via phone with customers to inquire about the cause and encourage them to make a payment. If the customer has not yet paid after another 7 days, the customer service staff makes another call. If at that time the customer still does not pay, the system is locked and the customer is required to pay a reactivation fee (14,000 UGX / ~ 5 USD) in order to unlock the system. This payment still contributes to your installments to the ownership of the product. However, the unit will stay blocked until you pay the fee. Generally, the vast majority of customers pay after the first payment reminder call. If the customer is still not able to pay, then they are given an option to return the system to the dealer and get back some of the deposit, as if they were renting the unit and therefore, only invested in the days that they were using it. If the product is faulty, then they will only be able to receive a refund for the value of the deposit of what they are able to return.





local contexts. In Uganda, the down payment was fixed at roughly the same retail price as our largest portable lighting-and-mobile-charging lantern—of which more than 1.5 million units have been purchased globally—at 75,000 UGX/~\$26 USD. The minimum increment for subsequent daily usage was 1500 UGX/ \$0.60 USD. The targeted payment period is thus 1 year, after which the customer has full ownership of the fully unlocked product.

Moreover, the D20g's repayment system is tamper-proof: if a product is "hacked" in an attempt to reprogram the unit so it no longer requires payment for usage, an alarm message is sent via GSM to alert the back-end and the unit is locked until a customer service rep can follow-up. Bi-directional communication also enables each unit to send back detailed data on payment and usage habits, which can be used in customer servicing and future product design upgrades.

The D20g thus constitutes a unique value proposition for energy poor consumers in the developing world: an affordable, reliable, plug-and-play but also upgradeable energy service of guaranteed quality. The higher than expected unit sales volumes (170%) seen in the DIV-funded go-to-market pilot confirms our hypothesis that this value proposition is clear to and demanded by consumers. In addition, it also generated invaluable learning for d.light and helped shape what is being built into the next generation of d.light home systems and other pay-as-you-go products.

*Pictures 3, 4, & 5: The D20g*

The two pictures on the left show the product as it arrives out-of-the-box. The photo on the right is a close up of the control system, indicating available credit and power.



### 2.1.2. Key insight

The information included in this section represents a mix of field-based learning from this pilot and parallel market and consumer research efforts; conversations with customers; quantitative customer interviews through the third-party impact evaluation;<sup>9</sup> and discussions with sub-contractors.

#### Product

- In general, customers are pleased with the product experience 6-months into ownership: the average response to a satisfaction scale of 7 on a scale of 1 to 10 where

<sup>9</sup> For more detail, see section below on Evidence of Impact. These statistics will be cited as IDinsight.



10 is highest.<sup>10</sup>

- 92% report that they normally use the product daily.<sup>11</sup>
- 97% have recommended to friends or family that they also purchase a product.<sup>12</sup>
- Customers were interested in additional lights for the base unit (4 total) and want to be able to charge more phones (2 total).
- While the ability to upgrade by later adding more LED lights was a compelling selling proposition, it didn't translate into significant rates of purchase of additional light bulbs: only about 2% of customers took advantage of the accessory lights.
- Customers found the control panel interface easy to use and like the light-switch feature.
- The only issues with the product hardware—sticking of the on/off button for some portable lanterns—occurred in the early stages of the pilot and were addressed immediately through providing replacement parts to dealers for customers who had experienced the problem, and correcting the root issue through product tooling modifications.
- The majority of issues that customers perceived to be related to the plastic “hardware” were discovered to be the result of the GSM connectivity. Specifically, customers were reporting product functionality issues that were actually the result of delayed communications with the product or dropped signals, which were in turn the result of faulty SIM cards or weak phone signals inside customer homes. Less than 1% of failures were attributable to actual GSM chip failure in the product. Nonetheless, d.light worked with the GSM chip supplier to improve the firmware to reduce failure of the component parts.
- Customer feedback suggests additional messaging around optimal usage on cloudy days, to avoid inadvertent battery drain, would be beneficial.

#### Payment Platform

- Only about 3% of customers purchased the product in cash with an upfront payment, indicating that the pay-as-you-go offering is valued by customers.
- The majority of customers (70%) has already, or is on track to, pay off the product at or before the expected 12-month time period. Roughly 20% are taking slightly longer to pay, perhaps due to being new to mobile money. The remaining 10% are true defaulters who cannot sustain payments and discontinue use of the system. This minority group of customers have often experienced a shock to their cash flow or an unexpected situation that requires large cash outlays—for example an illness—making it difficult to continue paying. This actual default rate was roughly the same as assumed in d.light's go-to-market model and so does not affect overall expectations on profitability or sustainability of consumer financing.
- Customers indicated additional payback time would be attractive. Our marketing

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<sup>10</sup> IDinsight.

<sup>11</sup> IDinsight.

<sup>12</sup> IDinsight.

research indicates that 2 years would be the maximum duration required to satisfy a sufficiently large swath of interested customers without utilizing an inordinate amount of working capital on consumer financing.

- While the overall price point proved appropriate for a significant number of consumers, lowering the price while maintaining quality is always an attractive proposition. Customers spoke of wanting the down payment to be as much as 50% lower. While this is not feasible at the current cost of component parts, but for the next generation of products, the down-payment is expected to be significantly lower.
- As mobile money payments is relatively new in Uganda, customers sometimes had to set up accounts through their D20g dealer. The significant amount of new users (12%) led to some perceived problems with the payment platform as customers learned how to fully and accurately use their mobile money accounts. Approximately 30% of customers preferred to use someone else's mobile money account to pay, such as a neighbor or their D20g dealer.<sup>13</sup>
- Before this pilot, d.light's primary learning environment on mobile money was in Kenya, where Safaricom's M-PESA provides the most popular and ubiquitous mobile money system. In Uganda, there are multiple telecoms with significant market share providing a mobile money service, including Airtel and MTN. Integrating multiple money platforms was a more complex and protracted process than expected, as each platform has its own set of requirements.

## **2.2. D20g go-to-market pilot**

By grant close,<sup>14</sup> a total of 8,996 units had been sold in this go-to-market pilot,<sup>15</sup> exceeding d.light's grant target of 5,250 by 71%.

The original distribution strategy prioritized brick and mortar outlets, of which 55 were activated during the pilot. The strongest outlets could drive about 50 sales per month, with an average per outlet of approximately 20 sales per month. Most dealers saw the biggest opportunity outside of their urban or peri-urban location, and sent field agent into rural areas to sell. Over time, the distribution strategy was adapted to build out a more "field agent" oriented model, with 140 field agents activated during the pilot period. These field agents are mobile and employ a range of outreach strategies to potential customers e.g. door-to-door sales, group meetings, and market activations. The highest performing agents can sell over 100 units per month. Both outlets and agents are paid on a commission basis, so that they do not have to invest upfront in the cost of the product. This means there are no start-up capital requirements for these dealers, enabling rapid outlet and agent acquisition to build out the

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<sup>13</sup> IDinsight

<sup>14</sup> September 19, 2014

<sup>15</sup> d.light's on-the-ground distribution partner was M-KOPA, a Kenya-based technology and sales company, who also managed the back-end software and customer service call center during this product pilot.

distribution network, plus rapid earnings and growth for strong dealers. Low-performing outlets or agents who cannot meet the daily target of identifying 5 prospective customers are dismissed quickly so that training and management resources can be reallocated to new, higher-potential dealers.

The marketing strategy for the D20g go-to-market launch was focused around the creation of a “big brand” feel to build consumer trust in a still relatively new product category with a new payment approach. Distributors were provided marketing consumables to post on their storefront and stand-up posters to place out front to draw consumers into their shops. Radio campaigns were developed for 3 local radio stations, featuring 30-second spots in which presenters—who actually had used the product in their own home—spoke about its benefits. Radio was a profitable investment, leading to a significant increase in sales each time an ad was aired. Furthermore, while the direct function of a call center is for customer support, a local call center with a local number also has marketing benefits as well—it shows customers that there is physical, long-term presence in the market. Branded vehicles and offices contribute to this as well. See Appendix 2 for examples of marketing collateral.

### **2.3. Next generation: D30**

Based on the learning outlined above plus additional ongoing market and customer research efforts, the following improvements will be made in the next generation solar home system product within our “D-series,” the D30.

An overview of expected product features for the D30 include a doubling of the panel size, to enable the product to fully charge even on cloudy days; an increase in the number of fixed lights that come with the base unit from 2 to 3; and an increase each LED’s brightness by 30-40%.

Secondly, in response to market learning, a more reliable payment system is being developed that is expected to also significantly lower the product cost. Rather than producing a product with an embedded GSM chip for that can lead to service issues where mobile coverage is weak or spotty, for our next generation system and back-end management system we have developed a payment and activation system that does not rely on an embedded GSM in the product. Instead, activation codes received by the customer via SMS on their own mobile phone when they make payments are then entered into the product with a built in key pad by the customer. This still enables customers to leverage mobile money to make payments, and as an added benefit, it also opens up the opportunity to leverage non-mobile money payment platforms such as scratch cards that are commonly used in many developing countries.

We also intend to offer an even more flexible payment plan: loans that range from 6-month to 2-year repayment periods, between which customers can switch at any time. This enables customers whose cash flow situation changes mid-payment stream to continue enjoying light and power while paying down the value of their system. We will no longer include a reactivation fee, to allow for a larger number of customers to sustain payments in the face of



cash flow shocks.

The D20g launch also afforded important learning about sub-contracting versus developing in-house capabilities, enabling the company to weigh the costs and benefits of building the capacity to execute. We arrived at the conclusion that we will be able to offer even better service and value for our customers if we can scale up without the costs of sub-contracting. For example, bringing technology development in-house will contribute to a significant share of the product's overall price reductions. d.light will continue to develop the appropriate sales channels not only through a partnership model but also by building out direct, d.light-managed distribution. While scaling up will require greater amounts of working capital, d.light expects to be able to execute the financing and collections, assuming our expectations on capital raising (both debt and equity) continue to be met.

Together, these improvements are expected to allow us to follow-up the market building groundwork we have executed to date with a significantly better product and customer experience at an even lower price point with a more flexible payment model.

### 3. Evidence of social impact

d.light's company theory of change hypothesizes that once energy poor households purchase a solar energy product, they offset their use of low quality lighting alternatives. Through increased use of high-quality, clean solar energy and decreased use of "status quo" solutions like kerosene, customer households experience a better overall living environment in which more and better quality light leads to higher productivity and general satisfaction; savings on energy expenditures over time; diminished health and safety risks (such as fires); and less polluting emissions.

For the D20g specifically, key impact questions included:

- What do early adopters of higher-power solar products look like?
- How do these customers feel about their purchase decision?
- How does the quality and quantity of light available to a household change after they purchase a D20g?
- How do these changes affect productive activities (chores, study, income generation)?
- How do these changes affect the household's finances and socioeconomic status?
- How do these changes affect household health and safety?

To examine specific variables within these questions, d.light commissioned research specialist IDinsight<sup>16</sup> to conduct a rigorous, independent impact evaluation on the household-level effects of D20g ownership.

The study employs a matching design<sup>17</sup> with difference in differences analysis.<sup>18</sup> For the baseline survey, approximately 500 households that had recently purchased d.light solar home systems ("d.light households," which constitute the treatment group under evaluation) and 1,500 comparison households were interviewed between mid-January and early May 2014. These same 500 d.light households and a statistically matched subset of 500 comparison households<sup>19</sup> were interviewed again between late August and October 2014, to measure the

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<sup>16</sup> More information on IDinsight is available at [www.idinsight.org](http://www.idinsight.org).

<sup>17</sup> Matching is a technique that allows researchers to draw a statistically valid comparison group by identifying individuals not exposed to a particular program or product on the basis of similarities to those who are exposed to the program or product.

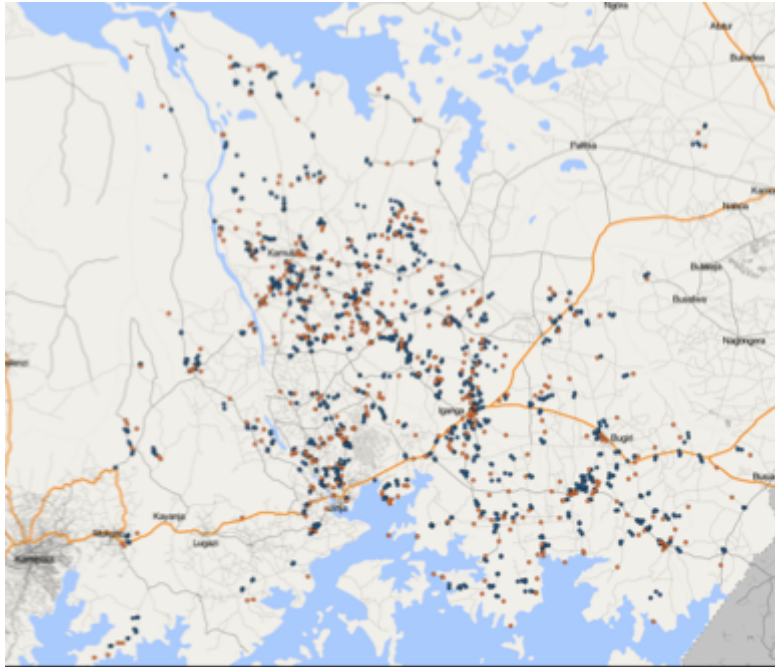
<sup>18</sup> Difference in differences allows researchers to measure change over time of a treatment group—in this case d.light customers—relative to the change of a comparison group of non-customers by subtracting the endline position of both groups from their initial position and comparing the differences. Therefore there are two survey rounds: baseline and endline.

<sup>19</sup> The comparison group in this survey represents a sample of households from villages near the d.light households, but without any exposure to D20g marketing as of the time of the baseline survey. The villages for the comparison households were selected by driving from the d.light customer's village toward the nearest urban center along the main road. One of the next three villages along this road was selected for the purpose of identifying comparison households. All households in these villages were listed with the help of a local council member; from these lists IDinsight drew the random sample of 1,500 potential comparison households to be

changes that occurred over that period for both groups and calculate the differences between the two groups. This difference constitutes the impact that can be attributed to ownership and usage of the d.light solar system on the households that purchased the system.

The results of the impact evaluation are summarized here. d.light will be sharing an in-depth Impact Report with USAID in January 2015 (including detailed technical notes on topics like IDinsight’s matching and analysis methodologies) for feedback on presentation of results, to be finalized for public dissemination strategy. See Section 6 below for more detail.

*Map 1: Location of household interviews in Eastern Uganda*



Orange dots represent d.light customers and blue dots represent comparison households. Some comparison households may be obscured due to close proximity.

surveyed at baseline. Enumerators visited each d.light household within four days of the purchase of the solar system and the three comparison households in neighboring villages the same day. Initially, comparison households were selected completely at random. However a preliminary comparison between households with d.light D20g systems and those without showed similarities on most key variables except for roof type and cell phone ownership. As a result, inclusion criteria for the remaining 70% of the comparison households was revised to require owning a cell phone and having a metal roof. This revision was made so that comparison households more closely resembled d.light households in terms of household income levels. The final subset of 500 comparison households revisited at endline were matched based on key variables likely to predict a household's ability to purchase the D20g system if it were being marketed in their communities, including but not limited to: prior lighting sources used and energy consumption, Progress out of Poverty Index scores, distance from an urban center, number of phones owned, household head occupation and education. IDinsight's technical matching strategy used to identify which households to resurvey at endline was reviewed by a technical advisor and can be found in the full impact evaluation report.



### 3.1. Summary of Key Findings

**Respondent households** are predominantly rural<sup>20</sup> (85%) and consist of an average 6 members, including 2 children in primary school and 1 under 5 years old. Household heads are primarily farmers (42%) or self-employed in small businesses (38%) such as motorcycle taxi driving. Households relied primarily on kerosene-fueled lighting (47%)—primarily kerosene candle “tadoobas”—or battery-powered flashlights (32%) at baseline, and self-collect biomass for cooking (75%). Just over half of them (52%) are likely to be under the BOP poverty line.<sup>21</sup>

**Customer satisfaction** with the D20g was high: d.light households reported an average 7 (out of 10) on a satisfaction scale, with 49% reporting 8 or higher. Similarly, 70% reported that their overall happiness “improved a lot” as a result of D20g ownership. The top four reported motivations for purchasing the unit were general home lighting (45%); economic benefits (44%); health and safety reasons (fumes, fires; 37%); and phone charging (34%). All of these purchase motivations were met by the product, as illustrated below. The majority of customers (97%) have recommended to friends or family that they also purchase a product.

**Key impact variables** for d.light households are summarized below.

#### Lighting usage outcomes

- Statistically significant increase in overall quantity and quality of light, for 3 additional hours of solar lighting per day.
- Significant reductions in usage of all non-electricity baseline lighting sources (kerosene-fueled tadoobas and lanterns, flashlights).
  - For example, regular usage of kerosene-based lighting dropped from 70% to 28%.
- Primary usage of high-quality solar lighting for almost every activity category.
  - No detectable change in time spent on productive activities; this may be the result of efficiency gains that allow for more productive activities to be performed without any detectable increases in time.

#### Energy expenditure & other socioeconomic outcomes

- Substantial baseline expenditure on lighting and mobile charging: average expenditure constitutes 13% of overall household budget.
- Statistically significant decreases on expenditure on baseline lighting sources (-51%) and mobile phone charging (-84%) for D20g users.
- Potential to save \$65 to \$506 over the course of D20g usage, based on a 4 to 10 year product lifetime.

<sup>20</sup> Specifically, in small local trading centers, which typically consist of one street of small stores and households in less dense areas.

<sup>21</sup> At a \$2.50/day (2005 PPP) poverty line, as established by the Progress out of Poverty Index.



- Statistically significant reduction in direct costs (-93%) and opportunity costs (-69% reduced frequency) associated with energy acquisition, in the form of errands exclusively for lighting or phone charging.

**Health & personal safety outcomes**

- Statistically significant reduction in burns (-88%) and household fires (-93%) from lighting products, to a <1% incidence.
- Decrease in percentage of households with members with coughs (-12%), as a proxy for respiratory health.

## 4. Cost-effectiveness

Market-based distribution of renewable, distributed, and democratized power is an important way to achieve positive development impact at a reasonable cost to consumers and public funders. The sections below outline cost-effectiveness from the perspective of consumers and public stakeholders, with further detail in the sections below.

### 4.1. Cost-effectiveness of financed home systems for consumers

#### 4.1.1. Versus “status quo” energy solutions

<i>Energy source</i>	<i>Functionality comparison</i>	<i>Cost comparison (annual)</i>	<i>Associated development costs</i>
<i>Firewood</i>	Lighting	N/A	High: bad for human and environmental health, soot, danger of fire, personal insecurity during collection.
<i>Kerosene-fueled products (tadooba, paraffin lantern)</i>	Lighting only	~\$3/month <sup>22</sup>	High: bad for human and environmental health, danger of fire
<i>Battery-powered torches</i>	Lighting only	~\$2/month <sup>23</sup>	High: bad for environmental health because of continuous battery disposal

<sup>22</sup> IDinsight

<sup>23</sup> IDinsight

<i>Electrical grid connection</i>	Lighting + general power, supply dependent	<p>~\$20/month<sup>24</sup></p> <p>Note that a grid connection in Uganda costs ~1,000,000 UGX / \$370 USD.</p>	Medium: Extremely bad for environmental health. But good for standard of living; although only 15% of Ugandans (primarily urban) have access to the grid, and many of these consumers are actively switching to solar because of the high costs of electricity, and exploitative billing practices.
<i>Solar power</i>	Lighting + low-power appliances (radio, mobile phones)	<p>Portables: Around \$35</p> <p>Home systems: Ranges from ~\$160 to several thousand dollars.</p> <p>Note that high quality brands can last 4+ years.</p>	None, only benefits (see section on Evidence of Impact)

#### 4.1.2. Versus other market-based solar solutions

Generally speaking, solar solutions all stand to deliver positive development impacts. However there are differences in product price, quality and distribution potential that influence the degree to which the realization of these impacts are likely.

<sup>24</sup> IDinsight

Product Category	Company / Product Name	Functionality Comparison	Cost Comparison	Additional comments
High-power portables	d.light / S300	<ul style="list-style-type: none"> <li>1.5 W panel</li> <li>Single point of ambient light and phone charging</li> <li>lithium battery technology = highest quality and longest-lasting available.</li> </ul>	~\$35	Widely available in Uganda and many developing regions
	Barefoot Power / Firefly Mobile Family	<ul style="list-style-type: none"> <li>1.5W panel</li> <li>Two sources of task lighting and phone charging</li> </ul>	~\$35	Available in Uganda and in select developing regions
	Greenlight Planet / Sun King Pro	<ul style="list-style-type: none"> <li>3.3W panel</li> <li>Single point of task lighting and 2 points of phone charging</li> <li>Lithium battery</li> </ul>	\$40	Available in Uganda and in select developing regions
	Non-branded Chinese manufacturers	<ul style="list-style-type: none"> <li>Often knock-offs of other brands made with cheap component parts.</li> <li>Lifetime of 3-6 months.</li> </ul>	\$10-45	Widely available in developing regions
Home systems	d.light D20g	<ul style="list-style-type: none"> <li>5W panel</li> <li>up to 5 lights, mobile charging, and radio</li> <li>highest quality and longest-lasting battery technology available (lithium)</li> </ul>	~\$220, with financing	Success as market leader in portable lights; indicates likelihood of success with home systems. 10,000+ systems will be sold in Uganda by end of 2014.
	Barefoot Power / Barefoot Connect 600	<ul style="list-style-type: none"> <li>6W panel</li> <li>4 lights</li> <li>Lead acid battery (&lt;50% product lifetime of d.light D20g)</li> </ul>	~\$160	Little traction in the market to date.
	Fenix International / ReadySet/ ReadyPay	<ul style="list-style-type: none"> <li>15W panel</li> <li>lighting, mobile charging, and radio</li> <li>Lead acid battery (&lt;50%</li> </ul>	~\$160, with financing	Co-branded with MTN in Uganda, but MTN-based distribution did not work so Fenix is

		product lifetime of d.light D20g)		now building out their own branded distribution system.
	Solar Now	<ul style="list-style-type: none"> <li>• 40-400W</li> <li>• lighting and low-wattage appliances</li> <li>• lead acid battery (&lt;50% product lifetime of d.light D20g)</li> </ul>	\$550 - \$3,500	5,000+ systems sold through non-GSM payment plan in Uganda, via franchisee network.

In addition to household-level solar products, micro-grids are another important solution to electrify off-grid populations. However micro-grids are best suited for densely populated areas inhabited by consumers able to regularly pay for electricity, so that the service provider can expect to pay back the set-up costs of a micro-grid installation within a reasonable timeframe. These are the same conditions required to make grid extension economically viable, which leads to instances in which a micro-grid installation is closely followed by grid extension. The national utility is usually able to provide electricity at a lower cost than the micro-grid service provider, and so consumers stop using the micro-grid and the upfront capital requirements are never recouped. This scenario has been seen in a number of notable cases in India and represents a real risk for investors, since it can take 20 years of operation to see a return on investment.

Conversely, solar home systems like the D20g are ideal for people at lower income levels living in moderate to low population densities – where 85% of the world’s un-electrified population currently lies.<sup>25</sup> This business model is much lower-risk for the energy access provider and their investors.

#### **4.1.3. Cost effectiveness of financed home systems for public stakeholders**

##### **4.1.3.1. Versus USAID financing the free distribution of solar products**

Development agencies and other funders seeking to catalyze step-change improvements in energy access globally must invest in market-based approaches like d.light’s. The incentives inherent in a for-profit model are the most effective triggers for scalable solutions. All of d.light’s products and business models must be cost-effective and self-sustaining for d.light to thrive as a business; customers must be willing to pay at least as much for our products as it costs d.light to deliver them.

Free distribution of solar energy solutions leads to market distortion: wasting financial resources by providing products to households that do not want or need them; distorting market prices when these goods are subsequently dumped on the market; and setting false precedents for consumers that additional products will come for free.

<sup>25</sup> *Energy Poverty: How to Make Modern Energy Access Universal?* (IEA, UNDP, UNIDO, 2010): 17.



USAID's investment of \$1,020,126 USD in d.light contributed to renewable, reliable energy access for almost 9,000 households (54,000 people) in less than 5 months – which translates into a cost to USAID of \$28 USD per household or less than \$5 USD per person per year of service.<sup>26</sup> Based on the market building d.light was able to achieve through this pilot, we expect to sell 10M home systems over a 10-year time horizon. This **reduces the cost of USAID's investment to \$0.05 USD per household or less than \$0.01 USD per person for 4+ years of energy access – or 1 cent per household per year. To achieve this same degree of coverage through free distribution, USAID would have to spend \$1.7 billion, or \$86 per household (\$14 per person).**<sup>27</sup>

Moreover, free distribution of solar energy solutions leads to market distortion: wasting financial resources by providing products to households that do not want or need them; distorting market prices when these goods are subsequently dumped on the market; and setting false precedents for consumers that additional products will come for free. In the long-run, strategic investments in market-building efforts such as the D20g go-to-market pilots will catalyze greater and more sustained adoption than free distribution, as consumer demand will be created and lead to follow-on purchases.

#### **4.1.3.2. Versus international donors and/or developing country governments investing in grid extension**

d.light believes that although grid extension is an essential aspect to increasing energy access in high-density areas, this is a prohibitively expensive strategy for reaching low-density, rural populations. With 85% of the energy impoverished living in rural areas, thinking beyond the grid is necessary to solving the energy access equation.<sup>28</sup> Grid extensions covering long distances in rural areas range from \$8,000-\$10,000 per kilometer,<sup>29</sup> and in some cases up to \$22,000.<sup>30</sup> Once built, utilities in developing nations can experience transmission losses in the double-digit percentage range, often 15-25%.<sup>31</sup> Aside from the incredible institutional cost of extending the grid, the high cost of a household grid connection is out of reach for most energy poor households in the developing world. Coupled with unreliable service, regular power outages, and unpredictable price increases, grid extension represents a wholly outdated and

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<sup>26</sup> Assumes conservative battery lifetime of 4 years

<sup>27</sup> Both calculations assume 6 people per household, the size of the average household in the Uganda target market.

<sup>28</sup> *Energy Poverty: How to Make Modern Energy Access Universal?* (IEA, UNDP, UNIDO, 2010): 17.

<sup>29</sup> "Reducing The Cost of Grid Extension for Rural Electrification." (National Rural Electric Cooperative Association International, Ltd. Washington, DC: World Bank, ESMAP, 2000): 1.

<sup>30</sup> "Electricity for the rest of the world—opportunities in off-grid solar power." SolarServer.com.

<http://www.solarserver.com/solar-magazine/solar-report/solar-report/electricity-for-the-rest-of-the-world-opportunities-in-off-grid-solar-power.html>.

<sup>31</sup> *Advantage Energy: Emerging Economies, Developing Countries and Private-Public Sector Interface.* (IEA, 2011): 32.

inappropriate energy option for the off-grid and under-electrified. Just as mobile phone technology provided the obvious leapfrog scenario over traditional landlines, renewable power provided through decentralized, distributed solutions must be the energy leapfrog of the 21<sup>st</sup> century.

The energy utility in Uganda (Umeme) is particularly challenging for users. It is notorious for irregular and insufficient supply; unreliable metering which then leads to overcharging users; constant price changes with little external communication around those changes; and unpredictable turn-offs by bill collectors. Customers have little to no visibility on how their bill is calculated, and in general feel distrustful of grid connections. While in Kenya the utility is much more mature and professionally managed, and so households truly do aspire to a grid connection, in Uganda and most other developing world markets, customers do not even aspire to engage with this sort of service provider. This makes investing in grid extension even less rational – unless the supply and management issues can be addressed as well, which of course further raises the costs.

Moreover, developing world governments are increasingly providing favorable VAT and duty treatments on solar products, including accessory appliances. In Uganda and Kenya, solar products are duty-free. Industry actors have shown a track record of success in lobbying governments to adopt more favorable solar tariffs, including d.light in Cameroon for example.

**In summary, market-based distribution of solar home system is a leading, cost-effective solution for consumers and public stakeholders alike, especially when both financial costs and development costs, plus the ability to scale, are taken into consideration.**

Intervention	Cost of reaching 20M households in 10 years (USD)		Associated development costs	Ability to scale
	To the consumer	To the public stakeholder, per household		
None: “status quo” low-quality lighting solutions <sup>32</sup> & phone charging	~\$63 annually <sup>33</sup>	N/A	Already scaled	High
<b>d.light D-series solar home system – market based</b>	<b>Medium: ~\$170<sup>34</sup> (for 4+ years of service)</b>	<b>\$113</b>	<b>High: to date &gt;8.5M d.light solar products sold worldwide</b>	<b>None, only benefits</b>

<sup>32</sup> Includes expenditure on low-quality sources like kerosene-fueled candles/lanterns, battery-powered flashlights, and candles.

<sup>33</sup> IDinsight

<sup>34</sup> Represents an average price over a 10-year time horizon, given planned cost reductions.

<i>d.light D-series solar home system – free distribution</i>	Low: \$0	\$1.7B <sup>35</sup>	Low (without perpetual public sector funding)	None, only benefits
<i>Grid extension</i>	\$490 for first year of service; \$120 in future years.	\$10,000 per kilometer	Low: for example only 15% electrification in Uganda to date	Medium: high for standard of living, but extremely low for environmental health

Taken as a whole, the D20g go-to-market pilot required \$2 million of investment, a little more than 50% of which came from USAID. This is a desirable level of leverage for public funders.

<sup>35</sup> Represents wholesale cost of unit and local logistics and distribution costs.

## 5. Pathways to Scale

The grant target of 5,250 products sold was exceeded by 71% for a total unit sales volume of 8,996, in turn impacting 44,980 people. We expect to see monthly sales rates of 2,000 units for the remainder of 2014 in Uganda, with the potential for accelerated growth in our D-series early 2015. Based on sales trends and demand forecasts, we expect to be able to double this monthly volume across 2-3 key markets by the second half of 2016.

Based on this degree of success, d.light is confident that our D-series home system products will require **an initial period of hybrid scaling to enable accelerated market development and significant up-front outlays for consumer financing**, but will ultimately scale commercially through private investment and revenue generation. We are confident in this pathway to scale for the following reasons.

### a) Customers demonstrated willingness-to-pay in our go-to-market pilot.

Selling 71% more units than expected within the grant period validates our hypothesis that a sufficient level of customers are willing to pay for the value of a solar home system product with four times the energy.<sup>36</sup> Similarly, default rates were at the level expected (10%), which confirms that customers are not overestimating their ability to maintain payments overtime.

Nonetheless, we recognize that adoption would be much higher if the daily payment requirements were even lower. We expect to address this consumer issue in the next generation through 2-year financing. Through a variety of cost-reductions we've been able to achieve through this pilot, we expect to significantly reduce the daily payment. To further expand affordability, we also expect to reduce the down payment and be more consumer friendly concerning reactivation fees.

### b) Sales growth is ahead of original expectations.

At the time of DIV Stage 2 proposal development, we expected to achieve a monthly sales rate of 2,300 systems at the beginning of Year 4, or mid-2016. We now expect to see this monthly volume sometime early 2015. At the time of proposal development, we projected selling 3,700,000 units over a 10-year time horizon—by mid-2022; we now expect to reach this level of scale a few years earlier, in 2020.

Our expansion plans are also positive: we are in the process of launching another pilot in Haiti around an updated version of the D20g, and have plans for additional pilots in Kenya and India in the next year.

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<sup>36</sup> Based on watt-hours.

Revised Global Sales forecasts:

Timeline	Projected Units Sold (cumulative)
2017 (2 years out)	500,000
2020 (5 years out)	3,000,000
2025 (10 years out)	10,000,000

**c) We will be making strategic improvements to our product offering and business model.**

Critical learning on areas for improvement on the D20g product and payment platform—and responses to this learning—have been detailed above. The D20g launch also afforded important learning about the functions d.light had to sub-contract at a pilot stage, enabling the company to weigh the costs and benefits of building the capacity to execute these functions internally within d.light. As discussed above, we arrived at the conclusion that we will be able to offer even better service and value for our customers if we can scale both in Uganda and globally without the costs of sub-contracting core product functions. For example, bringing back-end technology development in-house will contribute to a significant share of the product's overall price reductions.

Moreover, our pathway to scale will be supported by strategic partnerships. Throughout the D20g pilot, d.light has been building and strengthening a range of partnerships that will ensure successful global expansion. On the distribution side, we will be able to leverage a number of existing channel partners—for example the French oil and gas company Total's service station outlet network in the 20 countries where we partner with them. d.light will continue to partner with leading telecoms providing mobile money services so that pay-as-you-go home systems can accept payment from a wide variety of platforms. Our payment model will be facilitated through a call center-based customer support team. d.light has 2 years of experience working with call centers in Kenya, including with the firm that handles Airtel's service calls—and has now optimized the way in which we manage call center-based hires. As a result, we are in a position to provide the training, scripts, and proprietary reporting modules that feed into a cloud-based performance management system, which ensures high performance support.

### **5.1. Further funding requirements**

Although we are reaching a point where the D-series is attaining a breakeven sales rate, scaling for national coverage in Uganda remains highly capital intensive for two main reasons.

The first is working capital. At our current sales rate, we would be able to fund the working capital costs for the products out of revenue generated by the products already in-market. However a step-change in scale from a few thousand units per month to tens of thousands requires substantially more working capital than d.light has available.

The second is infrastructure costs. Based on the success of this pilot, we have learned that we



can provide the best value and service for customers if we establish a full team in Uganda to directly serve the market. By eliminating third party contractors, we will be able to significantly reduce prices to the customer while providing an improved product, improved servicing, and increased payment flexibility. By managing the operations on the ground, we will have a self-sustaining model that can be replicated and rapidly scaled in other countries without the need for reliance on a third party.

d.light has not yet been able to secure commercial funding to take this product vertical to the next level of scale because investors and lenders consider the business model to be quite risky at this early stage of market development. We believe it will take another 2-3 years of market growth and maturity before non-commercial funding would no longer be an essential component of driving expansion.



## 6. Dissemination & Outreach Strategy

d.light's dissemination strategy around the findings from this pilot will center on a dedicated Impact Report. A pre-final version of this report will be submitted to USAID in January 2015, at which time d.light will request DIV's review for feedback on the presentation of findings, confirmation of proper co-branding, and discussion on co-promotion opportunities.<sup>37</sup>

Once finalized and published, d.light will launch public dissemination activities in February 2015. Planned activities include the following.

- Publication of report on d.light's website
  - Posting of report on USAID's Development Experience Clearinghouse
- Press release announcing grant completion and report publication
- Email-based distribution of report to Partners, Champions, and Influencers
- Social media-based publicity of report
- A public event for presentation and discussion (webinar or in-person meeting)
- Placement of external articles on the report, authored by d.light and/or third parties
  - For example: Huffington Post, Stanford Social Innovation Review, Skoll Foundation Online
- Presentation of results in external events
  - For example: SE4ALL Forum, GOGILA Annual Conference, SEEP Conference, ANDE Metrics Conference

Primary audiences include the following.

- Investors and funders: USAID, DFID, Shell Foundation, Acumen, Omidyar Network
- Partners: Solar Aid, Mercy Corps, International Rescue Committee, Practical Action, Lighting Global, World Bank, International Finance Corporation, SKS Microfinance
- Relevant industry and business alliances: GOGILA, UN Foundation Energy Access Practitioner Network, UN Business Call to Action, Global Alliance for Clean Cookstoves, Renewable Energy and Energy Efficiency Partnership, Inclusive Business Action Network
  - Other business and practitioners in the sector (via GOGILA, Lighting Global)
- Other ancillary or research programs: Energy and Environment Partnership, Climate Scope, World Resources Institute, ENERGIA

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<sup>37</sup> d.light is interested in co-promotion with DIV on as many of these activities as possible and seeks DIV's support securing placement of articles and participation in relevant events.

## 7. Appendix

### 1.1. Appendix 1 - Grant management summary as of September 19, 2014

#### 1.1.1. Milestone Report Indicators


Note: Because IDinsight's research indicated that the average household size of D20g customers is 6, rather than 5 which is the global developing world average d.light uses, the figures below for "beneficiaries reached" have been adjusted accordingly and are therefore larger than what has been reported in previous milestone reports.

Milestone #	4	5	6	7	8	9/TOTAL
Indicator	(Cumulative totals, per previous reports)					
# of outlets activated	6	14	57	99	109	196
# of brand activators trained	10	34	138	198	236	319
# of beneficiaries reached	72	1,500	7,110	16,488	26,334	53,976

#### 1.1.2. Financial Summary


USAID/DIV Budget vs Actual September 19, 2012-September 19, 2014				
Funder	Line Item	Budget (USD)	Actual (USD)	Budget Remaining (USD)
USAID	Personnel	178,770	178,770	-
	Travel	54,900	6,334	48,566
	Other	220,919	269,485	(48,566)
	Contractual	565,537	565,537	-
	<b>USAID TOTAL</b>	<b>1,020,126</b>	<b>1,020,126</b>	<b>0</b>
d.light	Personnel	955,345	722,474	232,871
	Travel	10,000	-	10,000
	Other	15,000	168,481	(153,481)
	Contractual	-	92,582	(92,582)
	<b>D.LIGHT TOTAL</b>	<b>980,345</b>	<b>983,538</b>	<b>(\$3,193)</b>
<b>PROJECT TOTAL</b>				<b>Represents d.light contribution above original commitment</b>

## 1.2. Appendix 2 – Marketing collateral & photos of marketing efforts




# d.light D20-g

## Solar Home System



The d.light D20-g Solar Home System delivers power with no recurring costs through a roof-mounted solar panel. It includes 2 bright lamps that can be placed in separate rooms and independently controlled via wall switches. It also has a unique portable lantern with 2 brightness settings for added flexibility, and charges a wide variety of popular mobile phones and USB devices.

d.light D20-g is designed for easy installation, simple operation and a long life. It is available through M-KOPA for credit sale, and comes with a two-year warranty, building on d.light's reputation for quality, reliability and durability.



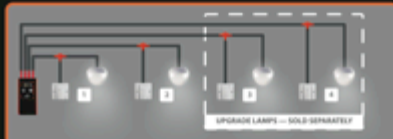
Not to scale

### Key Features

**All-in-one reliable lighting and mobile charging for your home and small business**

» **Flexible Lighting Solution Suitable for Any Lifestyle**

- 2 lamps with independent wall switches (upgradable to 4 lamps)




- 1 portable lantern for added flexibility in-home and outdoors
- 2 brightness settings (High-Low) enables easy adjustment to usage occasions
- Extended hours of light after one full day of solar charge

	Standard	LOW	HIGH
12 hours	12 hours	12 hours	8 hours
4 hours	4 hours	4 hours	4 hours

» **Easy Mobile Charging**

- USB connector with 6 adaptors to charge a wide range of popular mobile phones




- Phone Charge Time: ~ 3 hours (reference mobile phone Nokia 1110)

» **Simple Operation**

- Easy self-installation; simply plug in and start enjoying an on-grid lighting experience
- Control unit indicates solar charging, battery power status, GSM signal strength and credit status and helps you manage your energy consumption and payments

» **Unbeatable Quality**

- Replaceable long-lasting battery
- Certifications: PVoC, CE
- 2 year warranty from time of sale



### Packaging Information

Pack Dimensions (HxWxD): .....335 mm x 240mm x 113 mm


Units per Carton:.....8

Carton Dimensions (HxWxD):.....688 mm x 494 mm x 263 mm

Carton Weight (gross):.....17.95 kg

### Product Information

Number of Lamps.....	2 lamps (upgradable to 4) and 1 portable lantern	Product Lifetime.....	More than 5 years
Color.....	Solar Black	Battery Capacity.....	3000 (mAh); 19.2 (Wh)
Total Product Weight (gross).....	1.99kg	Battery Charging.....	Solar panel or AC/DC charger
Total Product Weight (net).....	1.76kg	Battery Charge Level Indicator.....	Yes, control panel LCD screen
Cable Length.....	solar panel = 6 m; lamp = 1x 4m, 1x8m	Battery Lifetime.....	3-5 years depending on usage
Accessory Lamp.....	8m	PV Panel Wattage Pmax.....	5W
		Solar Charge Indicator.....	Yes, control panel LCD screen
		Solar Charge Time.....	1 full day recommended



www.m-kopa.com Malipo rahisi

Contact an M-KOPA Dealer near you  
or  
Phone M-KOPA Customer Care on 0707 333222

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**For a bright and happy home...**

**Contact your local M-KOPA dealer to register**



Contact your local  
**M-KOPA**  
dealer

**All your lighting and mobile charging for just UGX 1350/- per day**



3 lights  
for a brighter  
home

Mobile  
phone  
charging

Save money -  
no more  
paraffin


Affordable  
payment via  
Warid Pesa

facebook.com/mkopasolar

**M-KOPA SOLAR**  
www.m-kopa.com Easy Payments


**M-KOPA SOLAR**  
www.m-kopa.com Easy Payments

**3 bright lights**




Brighter light for a happy home


**Mobile charging**




Stay connected – charge your mobile at home




**Long lasting battery (3-5 years)**  
Easily replaceable



**Modern USA design**  
Strong and durable d.light system




**2 Year warranty**  
Quality guaranteed




**M-KOPA customer care team**  
Always ready to help you

**Affordable**



Own your system with an affordable payment plan

**Easy to pay**



Convenient payment via Warid Pesa

**Easy payment plan**

1. UGX 75,000 deposit to take home your solarsystem
2. Credit costs UGX 1350/- per day - top-up any amount via Warid-Pesa
3. Own within one year – then no more payments

<i>Deposit</i>	<i>Daily credit</i>	<i>Complete payment</i>
<b>UGX 75,000 /-</b>	<b>UGX 1350 /-</b>	<b>12 months</b>

# All your lighting and mobile charging for just UGX 1350/- per day



3 lights  
for a brighter  
home

Mobile  
phone  
charging

Save money -  
no more  
paraffin

Affordable  
payment via  
Warid Pesa

[facebook.com/mkopasolar](https://facebook.com/mkopasolar)

\*Terms and conditions apply

**M-KOPA SOLAR**  
[www.m-kopa.com](http://www.m-kopa.com) Easy Payments



### 1.3. Appendix 3 – Go-to-market pilot photos

From top to bottom, these photos show:

- Marketing training;
- D20g dealers collecting stock;
- D20g dealer's shop;
- Nighttime product demonstration with customers (two photos);
- D20g in use in customer home.





Outline of Final Report - d.light to USAID/DIV







